Public debt sustainability and crises in emerging market countries: a presentation of the concepts and diagnostic tools

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The growth of public debt in emerging market countries during the 1990s and recent financial crises have once again highlighted the risks associated with fragile public finances in these countries. The debt restructurings of the 1980s resulted from excessive debt vis-à-vis *international banks. The 1990s saw a strong surge in financing on bond markets, which also brought risks with it and contributed to changing the nature and pattern of sovereign debt crises.*

The 1990s were marked by crises in investor confidence leading to sudden reversals in capital flows and sharp exchange rate movements, in turn sparking contagion phenomena *between different economic sectors and countries. In this context, the government has a crucial role to play in limiting the impact of the drop in revenue. When public finances are fragile, doubts about the government's ability to meet the financial cost of its intervention can contribute to prolonging the crisis or to triggering unsustainable debt dynamics.*

Emerging market countries that are heavily indebted in foreign currencies and subject to intermittent access to financial markets are particularly vulnerable to changes in international investor sentiment. Against this backdrop, the formulation of diagnoses making it possible to identify the risks weighing on public finances in emerging market countries is an important issue for the international community. In the light of recent experience, over the past few years the IMF has developed an analytical framework that should contribute to better account being taken of potential vulnerabilities in this area.

This article begins by recalling that the rise in public debt in emerging market countries has gone hand in hand with the growth in debt financing and that "capital account crises" have had a significant impact on public finances. It reviews the traditional analysis of debt sustainability and the factors that may explain the instability of debt dynamics in emerging market countries. Lastly, it presents the methods for debt sustainability analysis used by the IMF and the difficulties involved in making diagnoses.

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The acceleration of financial globalisation in the 1990s gave emerging market countries new financing opportunities and allowed them to reinforce their integration into the world economy. This trend, which resulted in an increase in securities issuance on "emerging" financial markets, gave investors new opportunities to diversify their portfolios. However, it was accompanied by financial crises which highlighted the predominant role of market dynamics in the sudden and massive reversals of capital flows.

The analysis of the causes of these crises has clearly underscored the responsibility of the economic policies followed, as well as the risks associated with fragilities in the banking sector and the sustainability of exchange rate regimes. By contrast, there have been few studies dealing specifically with the issue of the sustainability of emerging market countries' public debt, although it increased considerably during the second half of the 1990s. The lack of homogenous data on public finances and the difficulty of isolating the dynamics affecting public debt go a long way to explaining this. Nevertheless, the sovereign defaults and debt restructurings of recent years, notably in Argentina, have demonstrated the topicality and importance of these issues. The inclusion of debt sustainability analysis in the IMF's bilateral surveillance, the development of the analysis of balance sheet structures and the importance given to issues of transparency of information reflect the desire of the international community to identify the risks weighing on public debt before potentially uncontrollable dynamics are triggered.

This article proposes to set out the current state of thinking in this area and to explain how issues pertaining to the sustainability of emerging market countries' public debt have gradually become a cause for concern for the international community. It recalls first of all the main features of public debt developments in emerging economies in the 1990s and how the growth of public debt has been both the cause and consequence of serious financial crises in a context of increased market financing and the opening of capital accounts. It goes on to highlight the risk of unsustainability weighing on public debt dynamics in these countries. Lastly, it describes the methods used to analyse debt sustainability with a view to formulating diagnoses.

1| THE UNSTABLE DYNAMICS OF EMERGING MARKET PUBLIC DEBT

The debt crises of the 1980s underscored the risks for emerging market countries of excessive debt *vis-à-vis* international banks. The 1990s were characterised by the growth of public debt financed via the markets, the development of different types of risk and the emergence of new kinds of financial crisis.

1|1 Increasing financing *via* bond markets

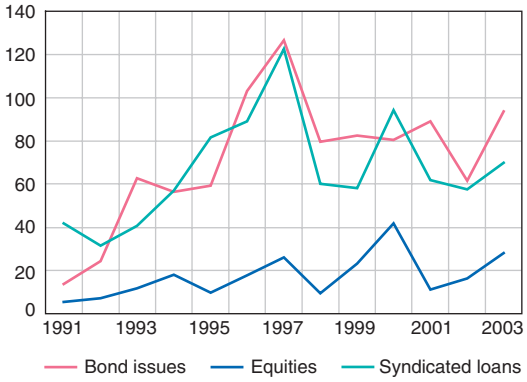
Having been significantly reduced in the early 1990s following the introduction of the Brady Plan[1] and the launch of major privatisation programmes, the public debt of the emerging market countries[2] began to grow again from the mid-1990s onwards. It increased by an average 10 GDP percentage points in less than 10 years, rising from 60% in the mid-1990s to 70% in 2002.[3] The increase in debt levels was far from being uniform and homogenous, with the differences reflecting in particular the impact of financial crises. In some countries, debt reached alarming levels. Public debt far outstripped the 100% of GDP threshold in Lebanon (178% in 2002) and Argentina (149% in 2002). Likewise, public debt levels in Turkey (89% of GDP in 2002), Brazil (78% of GDP in 2002), India (77% of GDP in 2002) and the Philippines (77% of GDP in 2002) are well above the average for emerging market countries.

1 *The Brady Plan was based on the conversion of bank loans into government bonds with partial forgiveness of loans, and encouraged bond issues on the markets. For an analysis of the impact of the Brady Plan on public debt, see for example Reinhart, Rogoff and Savastano (2003).*

2 *Emerging market countries are countries that have access to international financial markets; they are generally defined by reference to the list of countries making up a particular bond index. In its benchmark study on public debt in emerging markets, the IMF defines the population under review as the list of the countries making up the EMBI Global Index plus Costa Rica, Indonesia, India, Israel and Jordan. See the IMF, World Economic Outlook: "Public Debt in Emerging Markets: Is It Too High?" (September 2003).*

3 *IMF (2003b).*

Chart 1
Emerging market financing by sector
(USD billions)



Source: IMF, International capital market report; Global financial stability report, GFSR (1992 - 2004).

The rise in public debt occurred against a general backdrop of increasing capital flows to emerging economies in the 1990s, which facilitated the spectacular growth of bond markets (see Chart 1).

This radically changed public debt financing in emerging markets in the 1990s. Banks, which the experience of the crises of the 1980s had made more cautious and which were faced with a new regulatory environment (introduction of the Cooke ratio in 1988), reviewed their policy of financing sovereign States by syndicated loans and also became active on bond markets. Accordingly, following the securitisation of bank loans under the Brady Plan, the relative decline in syndicated loans in external public debt compared with debt financing continued in the 1990s. In 1988, one year before the implementation of the Brady Plan, the stock of public debt held by private creditors in the form of bank loans totalled USD 250 billion, whereas government bonds amounted to less than USD 50 billion. In 2003, bank loans accounted for only USD 100 billion, whereas bond debt totalled USD 300 billion.[4] Thus, the stock of government securities issued by emerging market countries on international markets increased more than five-fold between 1994 and 2000 (see Charts 2 and 3).

Chart 2
Sovereign bond debt on international markets
(USD billions)

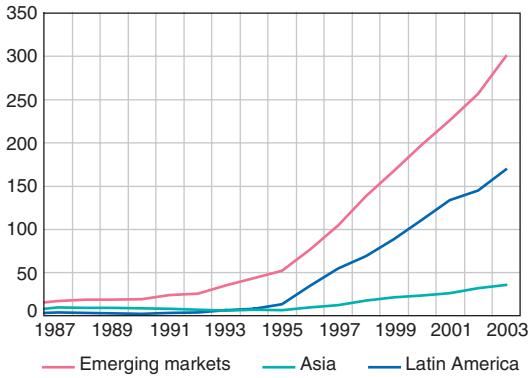
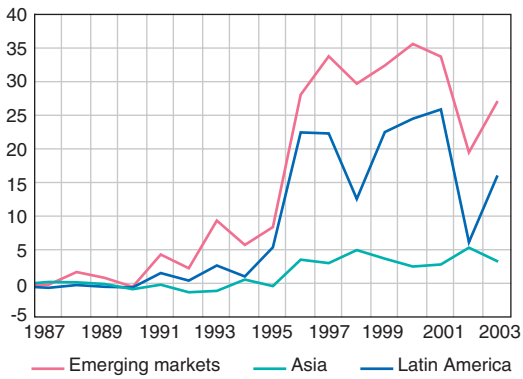


Chart 3
Sovereign bond issues on international markets
(USD billions)

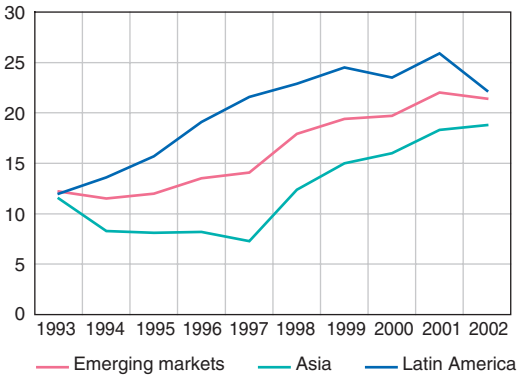


Source: Bank for International Settlements.

Furthermore, emerging market countries, in accordance with the recommendations of international financial institutions, have sought to develop national bond markets. As a result, the total amount of government bonds issued by emerging economies on local markets doubled between 1994 and 2000 from USD 526 billion to USD 1023 billion[5] and gave rise to growth of nearly 10 GDP percentage points in public bond debt (see Chart 4).

[4] *For a summarised presentation of the development of public debt financing in emerging markets, see IMF (2004c)*
[5] *For an analysis of the growth of national bond markets, see BIS (2002)*

Chart 4
Public bond debt on domestic markets
(as a % of GDP)



Source: GFSR, IMF (2004) "Emerging Local Securities & Derivatives Markets".

The size and structure of local bond markets vary greatly across emerging markets and they are difficult to compare with bond markets in industrialised countries. The major difference lies in the difficulty faced by emerging market countries in obtaining long-term financing on the national market.

1|2 Complex interaction between crisis and debt

The Mexican crisis (1994) was the first in a series of financial crises that were collectively dubbed "capital account crises". These episodes highlighted new destabilising dynamics affecting capital movements: the crises of the 1990s were characterised by the scale and abruptness of reversals of capital flows leading to the "sudden stop" of financing towards emerging economies (see Calvo, 1998). While the mechanisms at work differed from case to case, investor sentiment and foreign exchange rate movements play a major role in the way crises unfold. Crises are fuelled by the behaviour of international investors, which explains the phenomenon of contagion from one country to another. This phenomenon, which is fostered by the opening-up of capital markets in the emerging economies and their increased integration into international markets, has blurred the distinctions between the concepts of exchange rate crisis, banking crisis and debt crisis.

PUBLIC FINANCES WEAKENED BY FINANCIAL AND EXCHANGE RATE CRISES

Economic and financial crises have a direct effect on public finances by reducing the fiscal revenue base. Added to this are the cost of part of the impact of the financial crisis borne by the State and valuation effects on public debt. Thus, in the case of the Asian "twin crises" (1997-98), the banking crisis resulted in substantial costs for governments associated with rescuing the banking system (nearly 16% of GDP in Thailand, more than 50% in Indonesia), while the exchange rate crisis swelled the weight of foreign currency public debt. However, given that the economies affected were underpinned by sound public finances, the sustainability of public debt was not called into question.

By contrast, in a country whose public finances are already fragile, the absorption by the State of the costs of a banking crisis can have a destabilising impact. In Turkey, the implementation in 1999 of an IMF programme to reduce the current account deficit and combat inflation was undermined by a banking crisis (in October 2000), which led to the free float of the pound and to significant growth in public debt. However, the IMF's massive intervention and prospects of negotiations opening on membership of the European Union helped to avoid a restructuring of Turkey's public debt.

Even in the absence of a banking crisis, a crisis of confidence regarding a country's currency may force the authorities to abandon a pegging regime and lead to a sharp surge of debt denominated in foreign currencies or indexed to the exchange rate. Thus, the end of Brazil's "crawling peg" in 1999 resulted in a 9 GDP-percentage-point increase in public debt between 1998 and 1999, bringing it to 53% of GDP. Once again in 2002, although the real had been allowed to float, the forthcoming elections prompted a crisis of confidence regarding Brazil's currency, which led to a further swelling of public debt by nearly 10 GDP percentage points.

Box 1

Three examples of crises and their links with public debt

The Mexican, Thai and Brazilian crises are three examples of capital account crises that have in common the fact that they did not spark a default on public debt, but led to a strong depreciation of the national currency and a deterioration of the state of public finances.

Mexico (1994-1995)

- *Widening of the current account deficit (9.8% of GDP in 1993, 7% in 1994) and financing* via *capital inflows, largely short-term.*
- *Against the backdrop of a tightening of US monetary policy and domestic political unrest, capital outflows (March-April 1994), a decline in official reserves and issuance of short-term government securities indexed to the dollar known as* 'Tesobonos'*.*
- *Renewed crisis of confidence in November, float of the peso on 22 December. A USD 50 billion rescue plan is put in place by the US Treasury and the IMF in order to avoid a default on public debt.*
- *Between 1994 and 1996 public debt grew by a total of 18 GDP percentage points.*

Thailand (1997-1998)

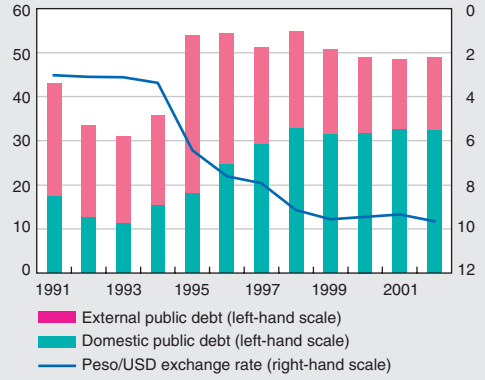
- *Strong growth (GDP up by 5.9% in 1996), widening of the current account deficit (7.9% of GDP in 1996), real appreciation of the baht, capital inflows (9.2% of GDP in 1996). Banking sector fragile.*
- *Capital outflows at the end of 1996, which then accelerate, banking crisis, interventions to prop up the exchange rate.*
- *July 1997, baht floated: it loses 20% of its value in one month, USD 4 billion IMF programme.*
- *Continued fall of the baht, stepping-up of the IMF programme and sharp economic slowdown; late 1998, reorientation of programme to bolster recovery.*
- *Between 1997 and 1999 public debt grows by 19 GDP percentage points.*

Brazil (1998-2002)

- *Weak growth; substantial public deficit (7.9% of GDP in 1998) and current account deficit (4.3% of GDP in 1998).*
- *In the wake of the Asian and Russian crises, capital outflows and rise in interest rates. December 1998, USD 42 billion rescue plan including USD 18 billion from the IMF; real floated in January 1999.*
- *Public debt grows by 9 GDP percentage points in 1999.*
- *In the run-up to the presidential elections in October 2002, concerns about the level of public debt push spreads to 1,500 basis points; real depreciates sharply (by 18% between March and June). A new IMF programme totalling USD 30 billion is approved.*
- *Public debt grows by 10 GDP percentage points in 2002.*

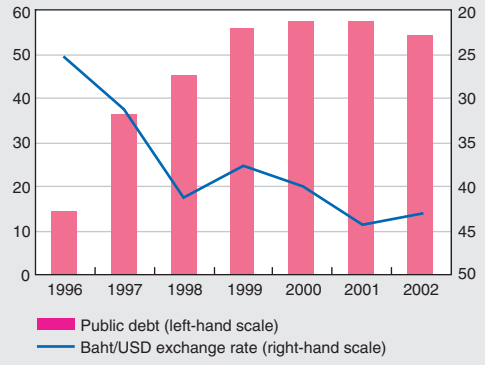
Mexico: public debt and exchange rate

(as a % of GDP) *(USD)*



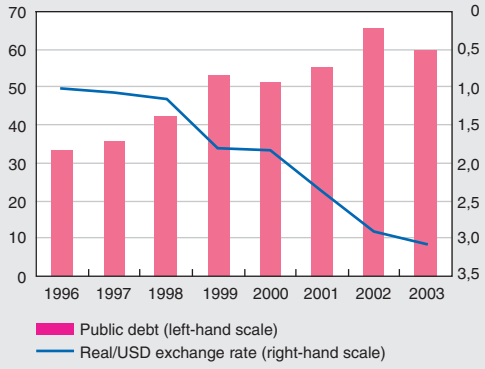
Thailand: public debt and exchange rate

(as a % of GDP) *(USD)*



Brazil: public debt and exchange rate

(as a % of GDP) *(USD)*



CRISES LINKED TO THE UNSUSTAINABILITY OF FISCAL POLICY

Doubts about public debt sustainability can trigger a crisis of confidence; the resulting exchange rate crisis generally leads to an increase in the foreign currency debt burden. The Mexican crisis, triggered in 1994 by doubts about Mexico's ability to honour its external public debt indexed to the dollar (*Tesobonos*), resulted in a surge in public debt of 20 GDP percentage points. Subsequently, in Russia, the deteriorating state of public finances and the authorities' lack of credibility led to an exchange rate crisis and to default on domestic and then external public debt in 1998.

The Argentine crisis thus appears to follow the pattern of the debt crises of the 1990s; in fact, however, it constitutes a break with the previous crises. The Argentine crisis was a delayed-action sustainability crisis: Argentina, which had followed an IMF programme since 1991, was for a long time presented as a 'model country' with regard to implementation of economic and financial reforms (notably regarding financial liberalisation and privatisation). While, during the period prior to the country's default, debate focused on the risks and advantages of a change of exchange rate regime, the vulnerabilities related to Argentina's public debt were greatly underestimated. As noted by the IMF's Independent Evaluation Office (IEO)[6], the Argentine crisis revealed "debt intolerance" in some emerging market economies. The case of Argentina illustrates the numerous and interlocking factors at work in the financial crises of the 1990s: fiscal and more general institutional fragility, inadequate structural reform, the constraints associated a pegged exchange rate regime, foreign currency debt, contagion effects from the Brazilian crisis, and more widely the impact of external shocks.

The Argentine default also led to a new awareness on the part of the international community of the economic and social risks associated with defaulting on public debt. Subsequently, discussions began on the different approaches facilitating the orderly resolution of debt crises. These included the proposal of a sovereign debt restructuring mechanism (SDRM) under the aegis of the IMF, the proposal of a *code of good conduct* for sovereign debt restructuring at the instigation of the Banque de France, and the development of collective action clauses with respect to bonds, advocated in particular by the G10.

While the proposal to set up a formal mechanism was not implemented due to a lack of consensus on the issue, the idea of a code of good conduct was taken up by the main creditors and issuers on emerging markets and paved the way for the "*Principles for stable capital flows and fair debt restructuring for emerging markets*" presented at the G20 in Berlin in 2004. Similarly, the inclusion of collective action clauses in bond issues on emerging markets has become increasingly widespread. At the same time, discussions about debt sustainability in emerging market countries continued, with a view notably to improving the diagnostic tools available to the international community.

2| SPECIFIC FEATURES OF THE ANALYSIS OF EMERGING MARKET PUBLIC DEBT SUBSTAINABILITY

For emerging market countries that are subject to intermittent access to financial markets, doubts about the sustainability of their public debt can have a devastating effect on their economies. The concept of sustainability encompasses questions about government solvency and debt liquidity, which are particularly pressing in emerging market countries.

2|1 Public debt sustainability: solvency and liquidity

A country's public debt is sustainable if its fiscal policy can be pursued without excessive adjustment in the future. Debt sustainability requires both that the country is regarded as being solvent, *i.e.* that its creditors have a positive opinion regarding its ability to repay its debt over the long term, and liquid, *i.e.* that it is able to roll over maturing debt. These factors depend largely on the confidence of creditors and the credibility of the national authorities.

[6] *IMF (2004d)*

GOVERNMENT SOLVENCY: AN ASSESSMENT OF ITS DEBT REPAYMENT CAPACITY

A sovereign debtor is solvent if its discounted primary surpluses are at least equivalent to its initial public debt (Agenor and Montiel, 1996; Roubini, 2001). Analysis of a government's solvency falls within a different legal framework than the approach followed in the case of a private entity for which it is possible to realise assets held as part of bankruptcy proceedings. The absence of such proceedings in the case of sovereign States derives from the principle of the inviolability of the State and the unseizability of public assets. The government is nonetheless obliged to maintain intertemporal fiscal balance (see Appendix I), given that its creditors are not ready to hold the public debt indefinitely, and therefore the country cannot indebt itself *ad infinitum*: this is the "no-Ponzi-game" condition.[7]

The intertemporal fiscal constraint defines a debt equilibrium path linking the interest rate and the rate of long-term economic growth with future discounted primary surpluses. Two variables appear essential: firstly, the primary surplus that enables the government to release funds to meet debt repayments; and secondly, the interest rate constituting the financial burden weighing on the debt.

However, the solvency criterion is a theoretical concept of limited practical value. It cannot be used to determine a benchmark debt threshold: in theory, irrespective of the initial level of the debt, the fiscal constraint can be respected. Moreover, solvency is a concept whose dynamics are unsatisfactorily taken account of in an uncertain environment: a country that is solvent at a given time may become insolvent in the wake of shocks.

As a consequence, it is common to talk about fiscal policy sustainability and, by extension, public debt sustainability.

Public debt is only sustainable as long as the country is solvent. On the other hand, the country may remain solvent while its debt is unsustainable and the authorities may subsequently choose to alter the fiscal policy pursued.

In practice, the country's ability to stabilise its debt levels relative to GDP over the short and medium-term is often used to measure debt sustainability: if it can be stabilised, the debt is sustainable. Conversely, a steady rise in the public debt-to-GDP ratio may prompt a crisis of investor confidence.[8] Accordingly, doubts may arise regarding the future ability of the authorities to take the necessary fiscal measures or regarding the impact of such measures on economic growth (Roubini, 2001). If the country has foreign currency debt, stabilising public debt entails the exchange rate effect being factored in. Any depreciation of the currency requires an increase in the primary surplus to stabilise the debt.

THE LIQUIDITY CONSTRAINT: REFINANCING MATURING DEBT

A country must continually refinance its maturing debt and can therefore experience crises of liquidity if this refinancing is not ensured. A liquidity crisis arises when the assets immediately available are not sufficient to cover the servicing of the debt; it can arise without the country's solvency being called into question. However, as was illustrated by the sovereign debt crises in emerging market countries in the 1990s, it is difficult *ex ante* to distinguish situations of insolvency from pure liquidity crises.

Investor perception seems here to be a crucial variable that determines the point at which the crisis is triggered. Indeed, debt crises are sparked by a liquidity crisis, generally as a result of difficulties in refinancing debt on international markets.

Taking account of self-fulfilling behaviour makes it possible to show how a liquidity crisis can degenerate into a solvency crisis in "crisis zones" (Cole and Kehoe, 1998).[9] In countries that display fragile public finances, a crisis of confidence increases the probability of default. The additional financing cost resulting from this helps to confirm investors' pessimism.[10]

The principal difficulty relates to the determination of factors that can bring about a crisis of confidence. Two explanations are put forward by the literature.

7 *This was a fraud mounted by C. Ponzi around 1920, in which contributions from new investors in the "chain" were used to pay interest to the first investors.*
8 *Chalk and Hemming (2000).*
9 *For a discussion of the conditions that can lead to sequences of events of this type, see Chamon (2004).*
10 *A simple presentation of this mechanism can be found in Detragiache (1996).*

Firstly, the crisis can be triggered by doubts concerning the country's willingness to repay its debt. In theory, the country only has an interest in honouring its obligations if the cost of default is greater than the adjustment necessitated by adhering to the repayment schedule. However, the experiences of Russia and Ecuador, which returned to the markets shortly after their default, limit the relevance of arguments about the economic cost associated with default and a cost/benefit analysis of defaulting. In this context, investors' perceptions of the "good faith" of the government in question are crucial.

Secondly, the crisis can be triggered by doubts concerning the country's ability to repay its debt in the light of the economy's fundamentals. Three schematic scenarios are advanced by Chui *et alii* (2000). In the first scenario, where there are no concerns about the country's "fundamentals", it is rational for each creditor to continue to finance the country, which encounters no financing problems. In the second scenario, where the country's "fundamentals" have deteriorated and the country appears to be insolvent, creditors do not renew their loans, a liquidity crisis is triggered and reveals the country's insolvency. Lastly, in the third scenario, where the country's fundamentals are in an intermediate zone, a liquidity crisis cannot be ruled out but its occurrence cannot be accurately predicted.

A crisis of confidence within this intermediate zone is not inevitable: the possibility of multiple equilibria stems from a lack of co-ordination between creditors. The equilibrium point is unknown before the decision taken by each investor whether to refinance the country or not. The equilibrium may be sub-optimal while still resulting from rational behaviour on the part of investors: creditors minimise the cost of finding information by following the market trend.

Models that incorporate investor behaviour help to explain some aspects of crises of confidence, but are not sufficient to account for the proliferation of crises in emerging market countries. The experience of the 1990s highlighted the fact that crises arise from the confrontation between investor sentiment and the fundamental vulnerabilities of emerging economies. Thus, a change in investor risk aversion or contagion phenomena can precipitate a crisis; however, the internal fragilities of the countries in question are at the root of the crisis.

2|2 Risk concentration in emerging market countries

The concentration of risk in emerging market countries and their reliance on external financing flows expose them notably to the risk of crises of confidence that can trigger dynamics of uncontrollable debt. Among the many factors[11] that can explain the fragility of emerging market countries, three deserve a mention: "original sin" and the consequences of exposure to exchange rate movements, the imperfect nature of information on emerging economies and the risks associated with herd behaviour, and the instability of capital movements and the resulting impact on emerging economies.

"ORIGINAL SIN"

One of the fragilities of emerging market countries derives from their inability to issue securities in their own currencies on international markets. This results in their accumulating foreign currency debt ("original sin" – see Eichengreen, 1999). This constraint is often accompanied by difficulty in obtaining long-term financing. However, the shorter the debt maturity, the higher the risk of a refinancing crisis.

To ensure servicing of its foreign currency debt, the country has to generate foreign currency resources over a long period, with the risk of being faced with an asymmetry between debt denominated in a strong currency and resources denominated in the local currency – "currency mismatch".[12] The refinancing of foreign currency debt imposes a liquidity constraint that links confidence in the currency to the assessment about the country's solvency: an investor will only lend money as long as he has a positive assessment regarding the

[11] *Many factors are at play: fragility of institutions, volatility of fiscal revenue, degree of openness to trade, past record of default, etc. See IMF (2003b), Kaminsky (2003).*

[12] *For an analysis of the risks associated with this kind of situation, see Goldstein, Turner (2004).*

country's ability to repay its debts over the long term and to have available the foreign currency needed to service its foreign currency debt.

The interaction between the fiscal constraint and the external constraint[13] further complicates the analysis of emerging market countries which, unlike developed countries, run the risk of being temporarily denied access to international markets. In practice, public debt sustainability is generally called into question by a refinancing crisis on international markets. The liquidity crisis may then lead to an exchange rate crisis which in turn may trigger a debt crisis. The crisis may result from a liquidity shortfall in the private sector – this was the case in the Asian crisis in 1997 – or in the public sector (Mexico in 1994).

IMPERFECT NATURE OF INFORMATION ON EMERGING ECONOMIES

Unlike industrialised countries for which high quality information is very rapidly available, emerging market countries suffer from the imperfect nature of the information concerning them. The absence of certain data, the poor quality of the available information[14] and patchy knowledge of the countries in question can give rise to an inaccurate assessment of their fundamentals. A return/risk analysis is even more problematic for emerging market countries given that it is sometimes very difficult to distinguish credit risk from exchange rate risk.

A system in which information is scarce and expensive to obtain encourages the development of herd behaviour, which is liable to trigger self-fulfilling crises. In the context of bank financing, the bank acts as the depositors' "representative" to monitor the quality of the investments made (Diamond, 1984); the consequence of a deterioration of the quality of investment is the cessation of new financing. On the markets, the information available is used to determine the price of securities and the impact on quantities is indirect but can be more sudden. In the light of information asymmetries, investors may be prone to herd behaviour, following those investors regarded as being the best informed. This can fuel contagion *phenomena*.

The difficulty in establishing the credibility of the economic policy in place, another feature of emerging market countries, augments the risk of a crisis of confidence and therefore reduces the authorities' room for manoeuvre: in an uncertain environment, the probability of default perceived by investors increases (Diamond, 1989). In this situation, creditors base their decisions on the country's default record and tolerate a lower level of debt than in developed countries (Reinhardt, Rogoff, Savastano, 2003).

It has therefore become crucial for the international community to have at its disposal tools that can be used to make reliable diagnoses. The efforts undertaken at the instigation of the G7 and the IMF with regard to improving transparency, the quality of statistics and the dissemination of data have enabled considerable progress to be made, which has helped to improve the overall assessment of risk. Accordingly, the publication of reports drawn up by the IMF as part of its Article IV missions and Financial Sector Assessment Programmes (FSAP) has become more widespread; and the major emerging countries now comply with the Special Data Dissemination Standard (SDDS), etc. However, further progress is needed with regard to the quality and harmonisation of the statistics available.

INSTABILITY OF CAPITAL FLOWS

Financial liberalisation in emerging market countries has encouraged the placing of government securities on the markets, thereby exposing the financing of public administrations to the reversals of capital flows. Claims on these countries constitute a very narrow asset class that is characterised by high returns corresponding to the assessment made regarding the level of risk (outside of crisis periods, over one-half of issues were concentrated on Argentina, Brazil, Mexico and Venezuela). Prices are correspondingly volatile: when a country defaults, emerging securities across the board may be subject to portfolio reallocations linked notably to competition from comparable assets such as US high yield securities.

[13] *Which includes public debt and private debt.*
[14] *Thus, the recording in the reserves of the Korean central bank of funds placed with Korean banks abroad (which turned out to be unavailable at the time of the 1997 crisis) contributed to clouding the signals sent out to investors.*

Box 2

Difficulties in the statistical analysis of public debt in emerging market countries

The lack of reliable data on public finances contributes to the difficulty of analysing debt sustainability in emerging markets (see IMF, 2003b). The problems encountered are of several kinds:

Availability of data: *generally speaking, information on external debt is more plentiful and more detailed than that on public debt; many countries have debt series that cover a limited time period; a breakdown of public debt between short-term and long-term debt or by currency of issue is rarely available.*

Coverage of data: *the data available for emerging market countries only rarely include State-guaranteed borrowing and the debts of local authorities and state-owned companies, etc.*

Uniformity of data: *comparisons between different countries are often problematic given the differences in the definitions used.*

Experience shows that emerging market countries are affected by reversals of capital flows – known as "sudden stops" – leading to disruptions in access to markets. Thus, the Mexican crisis, which led to capital outflows accounting for around 6% of GDP, was preceded by capital inflows representing 27.1% of GDP between 1989 and 1994 (Calvo, 1998). The intrinsic fragilities of emerging market countries are therefore compounded by the volatility of sources of external financing. In periods of crisis, while investor risk aversion mounts, economic policy is greatly constrained by the need to restore investor confidence. As a consequence, unlike industrialised countries, which can respond to fluctuations in capital flows by loosening economic policy, emerging market countries are forced to pursue procyclical policies.[15] Thus, as economic activity contracts, governments reduce fiscal deficits, both to persuade investors of the credibility of their economic policy and to reduce external deficits. Likewise, monetary policy is generally tightened in order to retain foreign capital and defend the national currency. Emerging market countries thus get into debt during periods of economic recovery and repay their debts during periods of crisis.

3| MAKING DIAGNOSES

The proliferation of defaults[16] and payment difficulties on sovereign bond debt in the 1990s illustrated the need to identify the risks weighing on the ability of countries to service their debt and served as a reminder of the difficulty of reversing negative debt dynamics at a late stage. Making reliable diagnoses very early on is therefore crucial both for private creditors and the international community.

The current focus on issues of transparency, quality of information and signalling effects demonstrates this concern. The International Financial Institutions, in particular the IMF, have continually sought to improve multilateral surveillance and to get a better grasp of the dynamics at work.

[15] *Calvo and Reinhart (1999), Calvo, Izquierdo and Mejia (2004), Kaminsky, Reinhart and Végh (2004).*

[16] *Whereas no defaults on bond debt had been recorded before 1998, 9 countries defaulted between 1998 and 2001 (see Moody's, 2003 and Appendix II).*

3|1 Fiscal constraint and debt indicators

Using macroeconomic indicators, several approaches enable a rapid diagnosis of public debt sustainability to be made. However, their limitations are very real and it is difficult to use them as the basis for economic policy recommendations.

CALCULATION OF DEBT INDICATORS

A preliminary empirical approach to debt sustainability may be based on the search for benchmark reference thresholds[17] following the example of the solution chosen for the HIPC initiative on external debt. However, the theory does not permit a single threshold to determine debt unsustainability. Empirically, risk zones can be identified: Reinhart, Rogof and Savastano (2003) show that countries that have a significant default history cannot – on a long-term basis – sustain high external debt (constituting for these countries external debt in excess of 15% or 20% of GDP). With regard to public debt, the IMF has found that over one-half of defaults (55%) have occurred when the public debt-to-GDP ratio was below 60% and over one-third (35%) when the ratio was below 40%. The IMF has thus defined a risk zone which, depending on the methods used, can start at 25% of GDP.[18]

The threshold-based approach revealed its limitations with the emergence of capital account crises: it is difficult to take account of the transformation in financing methods seen on financial markets using indicators based on a historical approach. For example, Mexico reduced its level of public debt by 40 GDP points between 1985 and 1994 to 35.8%[19] of GDP at the time of the crisis. Mexico's fiscal balance was even positive in 1992 (0.3% of GDP).

ANALYSIS OF THE TREND

When a country's public debt increases over several years, stabilising debt levels may constitute a simple response to prevent a sovereign debt crisis. It is possible, according to Blanchard (1990), to calculate the primary surplus required to stabilise the debt-to-GDP ratio. The difference compared with the actual primary surplus constitutes the fiscal gap. If the latter is positive, the debt is deemed to be unsustainable. The IMF (see the WEO, September 2003), has found that few emerging market countries have the level of primary surplus needed to stabilise let alone reduce the public debt-to-GDP ratio. Similarly, the tax rate required to stabilise the debt-to-GDP ratio may be calculated. A gap between the equilibrium rate and the actual tax rate also leads to the conclusion that the debt is unsustainable. These calculations provide a direct measure of the efforts a country needs to make to stabilise its debt.

While the advantage of these indicators is that they can be easily produced, they are difficult to interpret. In particular, for countries with relatively high debt levels, stabilising the debt-to-GDP ratio is no guarantee against crises of confidence sparked by investor risk aversion. As a consequence, in some cases, reducing the debt-to-GDP ratio, not merely stabilising it, is necessary.

The intertemporal fiscal constraint also makes it possible to ascertain whether the country's debt is excessive, by comparing the debt stock at a given date with discounted future primary surpluses using assumptions of long-term variables (see Appendix 1). This approach allows a diagnosis to be made at a specific point in time that can be adjusted in accordance with the changes anticipated in the growth potential and variations in fiscal policy. This method has enabled the IMF (2003b) to show that the actual public debt ratio is 2.5 times higher than that suggested by an analysis derived from the theoretical approach (25%).

Like the static indicator approach, the use of criteria based on debt stabilisation or the intertemporal fiscal constraint is not wholly suited to the new financing structure of emerging market countries. Indeed, the volatility of macroeconomic variables in these countries and the exposure to interest rate or exchange rate dynamics make any approach based on estimates of long-term variables tenuous.

[17] *For an analysis of advanced indicators of debt crises, see Manasse, Roubini and Schimmelpfennig (2003).*
[18] *IMF (2003b).*
[19] *IMF (2003a).*

Box 3

Paris Club: HIPC initiative/debt sustainability

From 1989 onwards, following the example of the London Club, the Paris Club began agreeing to partial cancellation debt for LDCs (least developed countries) whose debt-service costs were at least equivalent to 30% of their export revenue. The initial terms of cancellation were decided at the Toronto G7 (1988) followed by the so-called London terms (G7 summit in December 1991) and the Naples terms (1994), which increased the cancellation to 67% of consolidated non-ODA debt.

In view of the persistent debt problems in these countries, the IMF and the World Bank jointly proposed a new mechanism aimed at lasting relief for heavily indebted poor countries (HIPC). The initiative was reinforced at the G7 summit in Cologne in June 1999.

The initiative consists in reducing to sustainable levels the external debt burden of low-income countries whose debt is – in net present value terms – more than 150% of their exports. For commodity producing economies an alternative criterion, a debt-to-fiscal revenue ratio of above 250% has been used.

A list of 41 countries (potential HIPC countries) has been drawn up by the IMF and the World Bank; 27 countries have benefited from debt relief from Paris Club creditors amounting to USD 19 billion.

3|2 Taking account of uncertainties and financial vulnerabilities

In order to take better account of the complexity of recent financial crises, the IMF has radically changed the analytical framework used to measure debt sustainability.

THE IMF'S DEBT SUSTAINABILITY ANALYSIS: A DYNAMIC APPROACH

The IMF has developed a framework that incorporates an analysis of public and external debt sustainability. Projections for public and external debt are made for the medium term (five years), using a baseline scenario. This central scenario, which is based on the assumption of wholesale application of the recommendations of IMF programmes, generally shows a reduction in debt-to-GDP ratios. Alternative scenarios make it possible to estimate the conditions and reforms necessary to avoid a deterioration in the debt ratio. Lastly, other scenarios are based on a continuation of the historical trend of explanatory variables of debt. In order to ensure that the analysis is robust, the IMF applies shocks to the different variables in order to simulate crisis scenarios and to take account of the gaps observed historically.

This approach provides a general framework whereby an analysis can be applied uniformly to IMF members with a view to identifying a country's vulnerability to risks of debt unsustainability. The aim is to be able to adjust economic policy at a very early stage before dynamics of destabilising flows are triggered. Analysis of public and external debt sustainability has thus been systematically included in the preparation of IMF programmes. The original framework[20] was adapted to take account of the first exercises conducted.[21] It has moreover been applied as part of bilateral surveillance carried out by the IMF under Article IV of its statutes.[22] So far, it is still too early to draw any lessons from this initiative and its impact on the IMF's activity. The experience built up through the application of the same approach to a large sample should make it possible gradually to improve the diagnosis.

However, capital account crises have shown that an imbalance in one sector of the economy can be

[20] *See IMF (2002).*
[21] *See IMF (2003a).*
[22] *IMF (2004b).*

passed on to the public sector. The recognition of the risks posed by a fragile balance sheet structure has led to the efforts undertaken with regard to the public sector being complemented by a balance sheet approach to other sectors.

A COMPLEMENT: THE BALANCE SHEET APPROACH

The balance sheet approach is an analytical framework that makes it possible to identify in aggregate balance sheets by economic sector vulnerabilities linked to imbalances that cannot be observed in a consolidated balance sheet for the country as a whole.[23] It shows up four types of potential balance sheet imbalances: currency mismatches, maturity mismatches, capital structure problems[24] and solvency problems. This method can be applied to the public sector but in this context does not provide any conclusions regarding debt sustainability, unlike an analysis in terms of flows. On the other hand, the vulnerabilities that the balance sheet approach reveals allow illiquidity risk to be better determined.

The IMF has sought to incorporate this approach in its research on the risks associated with the level and structure of a country's debt.[25] However, so far the balance sheet approach has not made it possible to put together a set of indicators that can easily be used to conduct comparative analyses of different countries (mainly on account of statistical difficulties).

Moreover, it is difficult to take account of off-balance sheet liabilities using the balance sheet approach. But analysis of contingent liabilities (liabilities that materialise when a specific and essentially uncertain event takes place) must also be included in the work undertaken on debt sustainability. Contingent liabilities may take different forms such as the funding by the public authorities of bank restructuring, the cost of natural disasters, or the reclassification of local authorities' liabilities as part of the country's public debt. Likewise, it is also possible to include an estimate of the implicit liability of ensuring the production of public goods (*e.g.* social liabilities). The main difficulty stems from the uncertain and specific nature of situations revealing contingent liabilities, which makes them difficult to factor in.

The improvement of sustainability analyses and the account taken of balance sheet structures constitute progress in terms of the methods used to make diagnoses, which will gradually lead to better detection of the risks weighing on public debt sustainability. These advances do not, however, represent a guarantee against sovereign default. Thus, as indicated by the IMF's Independent Evaluation Bureau, debt sustainability analysis would have been of little use for Argentina in 2001, given the overestimation of the level of debt deemed sustainable and the underestimation of the potential impact of the abandonment of the currency board. In the final analysis, beyond the formulation of diagnoses, it is national governments' capacity to effectively counter the internal fragilities of emerging economies that is the decisive factor.

[23] *IMF (2004a), Allen* et alii *(2002).*
[24] *The capital structure risk relates to the financing method of the economy depending on the types of instruments used and the corresponding leverage.*
[25] *IMF (2003d, 2004c).*

The experience of the 1990s illustrates the difficulties involved in analysing the determinants of crises in emerging market countries. Numerous factors are at work and the growth of public debt has contributed to increasing the risks weighing on these countries. It has therefore become crucial to make diagnoses at an early stage in order to avoid the triggering of the uncontrollable dynamics that can lead to debt crises.

Nevertheless, in spite of the progress made in the methods used to make a diagnosis, it will always be difficult to decide on the level of debt deemed acceptable by the financial markets. Governments have no choice in this regard but to gradually build up strong credibility on the basis of the efforts undertaken in the areas of fiscal policy and structural reform.

Given the difficulties involved in significantly reducing high levels of debt, a policy that principally consists in relying on rapid growth in order to maintain a debt ratio that is acceptable to the markets is a risky gamble. As a consequence, preventing excessive accumulation of public debt through sound economic policy remains the best means of reducing the risk of crisis.

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APPENDIX 1

Government solvency, debt repayment capacity and stabilisation of the debt-to-GDP ratio

Intertemporal government solvency

In each period, governments are faced with immediate fiscal constraints which must be adhered to *ex post* and which reflect the debt dynamics:

$$(1) \qquad b_t^* = \frac{(1 + r_t^*)}{(1 + g_t)(1 + \varepsilon_t)} b_{t-1}^* - s_t$$

b_t^* represents the amount of debt in foreign currency at time t as a percentage of GDP; for the sake of simplicity, we shall assume that the debt is entirely in foreign currencies. s_t corresponds to the primary surplus at t (fiscal balance excluding interest on the debt) as a percentage of GDP, r_t^* to the nominal rate of interest on the debt in foreign currency, g_t to the nominal growth rate and ε_t to the variation in the directly quoted nominal exchange rate.

Any appreciation of the national currency *($\varepsilon > 0$)* permits a reduction in the foreign currency debt burden.

The intertemporal fiscal constraint is obtained using equation *(1)*, by adding up the immediate constraints:

$$(2) \qquad b_t^* = \sum_{j=1}^{N} E_t \left[\frac{k_{t+j}}{q_{t+j}} s_{t+j} \right] + lim_{N \to +\infty} E_t \left[\frac{k_{t+N}}{q_{t+N}} b_{t+N}^* \right]$$

$$\text{with } k_{t+j} = \prod_{i=1}^{j} (1 + g_{t+i})(1 + \varepsilon_{t+i}) \text{ and } q_{t+j} = \prod_{i=1}^{j} (1 + r_{t+i}^*)$$

The country's creditors refuse to extend long-term loans merely to ensure the payment of interest on prior debt: this is the no-Ponzi-game condition. It means that, over the long term, the growth rate of the debt must be lower than the growth rate of the interest rate. The last term, which is the discounted value of future public debt, should therefore converge to zero in the limit.

The intertemporal fiscal constraint is thus adhered to when the discounted primary surpluses cover current debt b_t^*:

$$(3) \qquad b_t^* = \sum_{j=1}^{+\infty} E_t \left[\frac{k_{t+j}}{q_{t+j}} s_{t+j} \right]$$

Long-term stabilisation of the debt-to-GDP ratio

The long-term stabilisation of the debt-to-GDP ratio requires a level of primary surplus in terms of GDP, s such that:

$$(4) \qquad s_t = \frac{r^* - g - \varepsilon(1 + g)}{(1 + g)(1 + \varepsilon)} b_t^*$$

If the GDP growth rate in foreign currency is higher than the interest rate ($r^* < g + \varepsilon$), the country can stabilise its debt as a percentage of GDP while still having primary deficits (and therefore fiscal deficits all the more so). Long-term debt can be stabilised without the country being solvent. Indeed, if the debt-to-GDP ratio is stable over the long term, the no-Ponzi-game condition requires that the GDP growth rate in foreign currencies be lower than the interest rate, a condition that is not necessarily met. On the other hand, when this condition is satisfied, stabilising the debt does not prevent the intertemporal fiscal constraint from being respected.

APPENDIX 2

Chronology of defaults on bond debt

(USD millions)

Year	Country	Total debt defaulted on
July 1998	Venezuela	270
August 1998	Russia	73 336
September 1998	Ukraine	1 422
November 1998	Pakistan	750
August 1999	Ecuador	6 603
January 2000	Ukraine	1 063
September 2000	Peru	4 870
June 2001	Moldova	145
November 2001	Argentina	82 268

Source: Moody's